CANADA
DEPARTMENT OF MINES
HON. MARTIN BURRELL, MINISTER; R. G. MCCONNELL, DEPUTY MINISTER

MINES BRANCH
EUGENE HAANEL, PH.D., DIRECTOR

THE
PRODUCTION OF IRON AND STEEL
IN
CANADA

During the Calendar Year
1917

JOHN McLEISH, B.A.
Chief of the Division of Mineral Resources and Statistics.

OTTAWA
J. DE LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1919

No. 498.

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ADVANCE CHAPTER OF THE ANNUAL REPORT ON THE MINERAL PRODUCTION OF CANADA, DURING THE CALENDAR YEAR 1917.

(Tons used throughout this report are short tons of 2,000 pounds, except where otherwise stated.)

IRON AND STEEL.

(INTRODUCTORY.)

The production of steel in Canada has been greatly stimulated by the demands created by the war and the production of both pig-iron and steel reached their highest output during 1917. The construction of new steel furnaces, including several electric furnaces, has greatly increased the steel-producing capacity, whereas pig-iron blast furnace capacity has remained practically stationary and pig-iron production has been brought to an output only slightly in excess of that obtained in 1911 and 1912.

The Canadian iron and steel industry continues to be based to a very large extent on imported iron ores and fuels. Only 4·2 per cent of the total iron ore charged to blast furnaces during 1917 was obtained from Canadian mines, the balance being imported from Newfoundland and the United States.

If the ores from Wabana, Newfoundland, be added to those from Canada, then about 44·4 per cent of the total blast furnace ore charge in 1917 was derived from British sources and 55·6 per cent from the United States.

It was shown in the report for 1913 that the total consumption of iron and steel in Canada during that year, which has probably been the maximum consumption of iron reached, was equivalent to from 6,000,000 to 7,000,000 tons of iron ore of 50 per cent grade. The Canadian production of iron ore during the same year was less than 5 per cent of this amount. The production of iron ore in Canada in 1917 was the lowest since 1900 with the one exception of the year 1911.

Trade in almost all classes of iron and steel products has become subject to government control and exports from Canada can be made only under license obtained from the War Trade Board. Similarly, exports from the United States to Canada can be made only under license obtained from the United States War Industries Board.

Prices, also, which had rapidly increased during 1916 and 1917, were placed under control in the United States in July of the later year, and since Canadian consumption is being derived so largely from the United States it may be of interest to quote the price basis as follows:—

September 24, 1917.—Statement issued by Committee on Public Information (*Official Bulletin*, September 25, 1917):

"The President has approved an agreement between the War Industries Board and the steel men, fixing the following prices, which become effective immediately and are subject to revision January 1, 1918, viz.:

Commodity.	Basis.	Price agreed upon.
Iron ore	Lower Lake Ports	$ 5.05 per G.T.
Coke	Connellsville	6.00 per N.T.
Pig-iron		33.00 per G.T.
Steel bars	Pittsburgh-Chicago	2.90 per 100 lb.
Shapes	" "	3.00 per 100 lb.
Plates	" "	5.25 per 100 lb.

Subsequently the maximum prices were agreed upon covering the entire range of iron and steel products.

Summary of Iron and Steel Statistics, 1914-17.

		1914.	1915.	1916.	1917
Iron ore shipped from mines	Short tons.	244,854	398,112	275,176	215,302
Canadian iron ore charged to blast furnaces.	"	182,964	293,305	221,773	92,065
Imported iron ore charged to blast furnaces.	"	1,324,326	1,463,488	1,964,598	2,084,231
Iron ore charged to steel furnaces	"	37,686	74,872	55,059	39,793
Pig-iron made in blast furnaces	"	783,164	913,775	1,169,257	1,156,789
Pig-iron made in electric furnaces	"	....	....	....	13,691
Pig-iron and ferro-alloys exported	"	19,063	26,545	46,166	45,293
Pig-iron imported	"	78,680	47,842	58,130	83,400
Ferro-alloys made	"	7,524	10,794	28,628	42,465
Ferro-alloys imported	"	22,147	13,758	14,777	12,829
Pig-iron and ferro-alloy consumption	"	872,452	959,254	1,255,218	1,264,870
Pig-iron used in steel furnaces	"	619,030	747,834	949,444	1,112,082
Steel ingots and castings made	"	828,641	1,020,336	1,428,249	1,745,734
Steel rails made	"	428,225	232,411	90,123	46,645
Canadian coke used in iron blast furnaces.	"	330,269	578,743	712,715	634,962
Imported coke used in iron blast furnaces.	"	590,902	486,022	645,488	723,657
Iron and steel imported	"	878,179	771,007	864,916	929,776
Number of completed blast furnaces	No.	22	19	20	....
Number of men employed in blast furnaces	"	1,018	1,004	....	....
Wages paid in blast furnaces	$	693,632	675,453	....	....
Value of pig-iron produced	$	10,002,856	11,374,199	16,750,898	24,290,101
Value of iron and steel goods exported	$	14,391,746	48,268,148	63,857,681	46,791,681
Value of iron and steel goods imported	$	80,063,679	74,308,983	129,090,168	186,538,538

Average Monthly Prices of Iron and Steel Products in Pittsburgh in 1917.*

—	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Pig-Iron.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Bessemer ....per g. ton	35 95	35 95	37 45	42 20	44 95	55 20	57 95	53 55	48 30	37 25	37 25	37 25
Basic. .... "	30 95	30 95	32 85	39 20	42 15	50 20	53 20	52 75	46 20	33 95	33 95	33 95
Foundry No. 2 "	31 95	33 95	36 55	39 95	43 55	51 00	55 95	55 55	48 95	33 95	33 95	33 95
Malleable..... "	31 95	34 45	36 95	39 95	43 65	51 05	53 95	55 55	50 525	35 20	34 45	34 45
Gray Forge.... "	30 95	30 95	32 75	38 20	42 25	49 60	52 95	52 95	47 425	32 45	32 95	32 95
Ferro Alloys.												
Ferro silic. (50%) "	122 50	156 25	175 00	187 50	230 00	230 00	237 50	225 00	212 50	171 25	157 50	172 50
Ferro-silic. (10%) "	42 00	42 00	49 80	57 50	67 00	82 50	92 25	95 00	95 00	80 00	55 00	55 00
Semi-finished.												
Bessemer Billets "	60 00	62 50	67 00	72 50	85 00	93 75	100 00	93 00	73 75	58 75	47 50	47 50
Open h. Billets.. "	60 00	62 50	67 50	72 50	85 00	93 75	100 00	93 00	73 75	58 75	47 50	47 50
Bessem. sh. bars "	60 00	62 50	67 50	72 50	88 00	101 25	105 00	96 00	82 50	65 50	51 00	51 00
Open-hearth sheet bars...... "	60 00	62 50	67 50	72 00	88 00	101 25	105 00	96 00	82 50	65 50	51 00	51 00
Wire rods....... "	73 75	75 00	75 00	83 75	88 00	92 50	95 00	96 00	90 00	73 50	57 00	57 00
Rolled products.												
Per 100 lbs.												
Structural shapes, base.	3 10	3 25	3 45	3 70	4 00	4 00	4 50	4 50	3 75	3 00	3 00	3 00
Plates, base.....	3 60	3 75	4 20	4 50	4 50	4 50	5 65	6 80	6 85	3 25	3 25	3 25
Steel bars, base..	2 95	3 00	3 20	3 40	3 50	3 65	3 90	4 00	3 73	2 90	2 90	2 90
Bar iron, base..	3 25	3 25	3 25	3 40	3 90	4 60	5 00	5 25	5 25	5 25	3 90	3 50
Shafting, discount	10 00	10 00	10 00	10 60	10 00	5 00	5 00	5 00	5 00	6 25	17 0	17 00
Steel pipe, ¾ to 3 in. disc ....net ton	64 00	63 50	60 00	55 00	49 00	47 25	42 00	42 00	42 00	42 00	49 00	51 00
Standard spikes.	3 40	3 40	3 50	3 65	3 90	4 20	4 70	6 20	6 50	6 15	5 00	4 75
Hoops........	3 50	3 50	3 90	4 10	4 70	5 75	6 00	6 00	6 00	6 00	4 60	3 50
Bands	3 00	3 00	3 35	3 35	3 60	5 50	6 00	6 00	6 00	6 00	4 30	2 90
Structural rivets.......	4 25	4 25	4 50	4 75	5 05	5 25	5 25	5 25	5 25	5 25	5 00	4 65
No. 28 blacksheets....	4 55	4 55	5 05	5 75	7 00	8 15	9 00	9 00	8 75	7 75	5 25	5 00
" gal. sheets. ..	6 55	6 80	6 80	7 55	8 80	9 95	10 25	10 25	9 70	8 80	6 60	6 25
No. 10 blue annealed sheets............ ...	4 10	4 35	4 70	5 35	6 65	8 00	8 50	8 50	8 50	7 85	4 75	4 25
Tin plate..	6 85	7 00	7 50	7 50	7 90	9 25	10 00	10 00	10 00	10 00	8 75	7 75
Wire nails, base.......	3 00	3 00	3 16	3 20	3 50	3 65	4 00	4 00	4 00	3 90	3 50	3 50
Plain wire, base.......	2 95	2 95	3 08	3 18	3 45	3 60	3 95	3 95	3 95	3 85	3 25	3 25
Old Material.												
Per net ton.												
Heavy melting steel....	23 25	21 90	23 40	28 15	28 40	40 00	40 25	36 60	35 50	31 30	29 60	30 00
Low Phosphorus......	32 00	30 00	33 00	34 25	36 60	43 50	52 75	43 00	47 25	43 50	39 00	39 00
No. 1 cast...........	20 00	19 75	21 50	23 35	24 60	33 25	34 75	35 00	32 50	28 00	28 50	28 50

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* From "Iron Trade Review," Cleveland, O., Jan. 3, 1918, p. 126.

IRON ORE.

Shipments of iron ore were made during 1917 from nine mines or properties, but at five properties only were mining operations in progress, shipment from the other four being made from ore piles remaining from operations of previous years. The total shipments were less than in 1916 by 59,874 tons, a decrease of 21 per cent, and with the exception of 1911 were the lowest since 1910. The total shipments for the year were 215,302 tons valued at $758,621 as against 275,176 tons valued at $715,107 in 1916.

In 1917 shipments included 46,050 tons marketed in Canada and 169,252 tons sold for export. In 1916, 134,568 tons were reported as marketed in Canada and 140,608 tons sold for export. The ores shipped in 1917 comprised 17,741 tons of magnetite, titaniferous magnetite and ilmenite and 197,561 tons of roasted mixture of siderite and high sulphur hematite. The 1916 shipments included 45,541 tons of hematite; 210,522 tons of siderite and high sulphur hematite, roasted; 15,904 tons of magnetic concentrates and 3,200 tons of ilmenite.

There were no shipments of iron ore from Nova Scotia or New Brunswick deposits during the year though some development work was done by the Nova Scotia Steel and Coal Company, at Glencoe in Cape Breton. The Nictaux Nova Scotia and Bathurst New Brunswick properties owned by the Canada Iron Foundries, Ltd., still remain idle.

In Quebec the ilmenite property at Ivry-on-the-Lake, Terrebonne county, was again operated by the Manitou Iron Mining Company, the output being shipped as usual to Niagara Falls, N.Y.

Some titaniferous ores were also mined by the Baie St. Paul Titanic Iron Ore Company from the property "312" St. Urbain, Charlevoix county.

In addition to these active mining operations some magnetite ore was shipped from old dumps remaining at the Bristol mines in Pontiac county and at Ironsides in Hull township. The latter ore was shipped to Hull and Montreal and used in the calcining of magnesite at these places.

In Ontario the Algoma Steel Corporation was the principal shipper operating the Helen and Magpie mines. The Helen mine output during the past two years has consisted chiefly of high sulphur hematite which has been shipped to the Magpie plant and there mixed with siderite. The blended ore is roasted in rotary kilns producing a Bessemer grade of ore part of which was shipped to the company's furnaces at Sault Ste. Marie, but the greater portion going to United States furnaces.

Work on the magnetite ores at Sellwood owned by Moose Mountain, Ltd., was chiefly on construction and development including the experimental operation of the concentrating and briquetting plant during the last six months of the year. A few hundred tons only of concentrate and briquettes averaging over 62 per cent iron were shipped to plants in southern Ontario. A small shipment of titaniferous ore was made from the Orton mine in Hastings county by the Tivani Electric Steel Company of Belleville, and of hematite ore from the Playfair mine, near Perth, by the Canadian Union Iron Mines Corporation, Ltd.

Shipments of Iron Ore by Provinces, 1915-16-17.

Provinces.	1915.		1916.		1917.	
	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.
		$		$		$
New Brunswick	3,683	8,261				
Quebec	....	....	3,209	8,308	17,189	54,815
Ontario	394,429	766,166	271,967	706,799	198,113	703,806
	398,112	774,427	275,176	715,107	215,302	758,621

Shipments of Iron Ore by Classes of Ore, 1907-1917.

In Short Tons.

Year.	Hematite.	Magnetite.	Carbonate Including Siderite.	Bog Ore.	Total.
1907	205,795	50,073	42,740	14,248	312,856
1908	173,164	49,946	4,869	10,103	238,082
1909	190,473	74,240	....	3,330	268,043
1910	130,380	127,768	....	1,270	259,418
1911	137,399	72,945	....	....	210,344
1912	86,971	128,912	....	....	215,883
1913	(a) 92,386	215,248	....	....	307,634
1914	89,454	45,562	109,838	....	244,854
1915	205,989	59,217	132,906	....	398,112
1916	45,541	19,113	(b) 210,522	....	275,176
1917	....	17,741	197,561	....	215,302

(a) Small tonnage of siderite included.
(b) Includes roasted siderite and a blend of siderite and high sulphur hematite, roasted.

Shipments of Iron Ore by Provinces, 1886-1917.

Calendar Year.	New Brunswick.	Nova Scotia.	Quebec.	Ontario.	British Columbia.	Total. Short Tons.
1886	....	44,388	....	16,032	3,941	64,361
1887	....	43,532	13,404	15,698	2,796	76,330
1888	....	42,611	10,710	16,894	8,372	78,587
1889	....	54,161	14,533	....	15,487	84,181
1890	....	49,206	22,305	5,000	....	76,511
1891	....	53,649	14,380	....	950	68,979
1892	....	78,258	22,690	....	2,300	103,248
1893	....	102,201	22,076	....	1,325	125,602
1894	....	89,379	19,492	....	1,120	109,991
1895	....	83,792	17,783	....	1,222	102,797
1896	....	58,810	17,630	15,270	196	91,906
1897	....	23,400	22,436	2,770	2,099	50,705
1898	....	19,079	17,873	21,111	280	58,343
1899	....	28,000	19,420	25,126	2,071	74,617
1900	....	18,940	19,000	82,950	1,110	122,000
1901	....	18,619	15,489	272,538	7,000	313,646
1902	....	16,172	18,524	359,288	10,019	404,003
1903	....	40,335	12,035	209,634	2,290	264,294
1904	....	61,293	16,152	141,601	....	219,046
1905	....	84,952	12,681	193,464	....	291,097
1906	....	97,820	9,933	141,078	....	248,831
1907	....	89,839	12,748	207,769	2,500	312,856
1908	....	11,802	10,103	216,177	....	23 082
1909	....	....	4,150	263,893	....	268,043
1910	5,336	18,134	4,503	231,445	....	259,418
1911	31,120	22	3,616	175,586	....	210,344
1912	71,520	30,857	1,185	112,321	....	215,883
1913	86,416	20,436	5,102	195,680	....	307,634
1914	4,775	....	....	240,079	....	244,854
1915	3,683	....	....	394,429	....	398,112
1916	....	....	3,209	271,967	....	275,176
1917	....	....	17,150	198,152	....	215,302

EXPORTS AND IMPORTS OF IRON ORE.

Mine operators have reported directly the quantity of iron ore sold for export during the calendar year 1917 as 169,250 tons, as against 140,608 tons sold for export in 1916, 89,730 tons in 1915, and 60,414 tons in 1914. These records differ slightly from those reported by the Department of Customs and shown in the table. The United States Department of Commerce record of imports from Canada is also given for comparison.

The customs record of imports of iron ore is shown in the table, the total for 1917 being only slightly less than that of 1916 but at a considerably higher price.

According to returns received from blast furnace operators the quantity of imported ores charged to blast furnaces during 1917 was 2,084,231 tons, as against 1,964,598 tons in 1916. The imported ores charged in 1917 included 874,134 tons from Newfoundland and 1,210,097 tons from the United States "Lake district." In 1916 the imported ores charged included 914,194 tons from Wabana, Newfoundland, and 1,050,404 tons of United States "Lake ores."

The total quantity of imported ores charged to Canadian blast furnaces since 1886 has been 21,493,125 tons, while the total quantity of iron ore shipped from Canadian mines during the same period was 5,974,779 tons.

Exports of Iron Ore.

Calendar Year.	Canadian Customs Record.			Calendar Year.	Imports into the United States from Canada.*		
	Short tons.	Value.	Average value.		Short tons.	Value.	Average value.
		$	$			$	$
1909.	21,956	61,954	2·82				
1910.	114,499	324,186	2·83				
1911.	37,686	133,41[illegible]	3·54	1911.	56,538	106,038	1·87
1912.	118,129	382,005	3·23	1912.	119,476	201,882	1·69
1913.	126,124	426,681	3·38	1913.	201,443	409,098	2·03
1914.	135,451	360,974	2·67	1914.	58,816	153,415	2·61
1915.	79,770	206,823	2·59	1915.	94,219	245,092	2·60
1916.	161,260	541,779	3·36	1916.	153,255	509,602	3·32
1917.	164,004	660,673	4·03	1917.	200,239	766,688	3·83

*Compiled from the "Foreign Commerce and Navigation of the United States."

Imports of Iron Ore, 1912-1917.

Calendar Year.	United States.*		Newfoundland.		Other Countries.		Total.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
		$		$		$		$
1912(*9 mos.)	1,206,567	3,090,207	840,892	840,892	50	975	2,047,509	3,932,074
1913.	1,072,156	3,007,653	869,669	869,669	500	502	1,942,325	3,877,824
1914.	749,979	1,972,550	389,850	389,850	7,279	24,958	1,147,108	2,387,358
1915.	715,060	1,568,866	789,029	762,328	24	561	1,504,113	2,331,755
1916.	1,364,992	3,463,419	974,685	955,594	....	....	2,339,677	4,419,013
1917.	....	....	....	....	....	....	2,251,397	5,124,889

*Imports of iron ore separately stated in Customs Reports from April 1912 only.

PRODUCTION OF IRON ORE IN NEWFOUNDLAND.

The iron ore deposits at Wabana, Newfoundland, are owned and operated by the two Canadian companies operating coal mines and steel plants at Sydney and Sydney Mines, Cape Breton. The shipments from Wabana mines during 1917 were 883,346 short tons, all of which went to Cape Breton. The total shipments from Wabana since the mines were first operated in 1895 have amounted to 17,421,042 short tons, of which 11,622,287 tons were sent to Nova Scotia, 2,078,197 tons to the United States, and 3,720,558 tons to Great Britain and Europe.

Annual Shipments of Iron Ore from Wabana Mines, Newfoundland.

Calendar Year.	To Nova Scotia.	To United States.	To Great Britain and Europe.	Total Shipments.
	Short tons.	Short tons.	Short tons.	Short tons.
1895	2,686			2,686
1896	17,410	22,798		40,208
1897	12,143	33,039	5,651	50,833
1898	34,622		78,640	113,262
1899	26,311	98,485	214,322	339,118
1900	195,507	153,867	14,776	364,150
1901	457,064	84,292	279,102	820,458
1902	376,322	96,702	341,421	814,445
1903	273,283	90,711	287,793	651,787
1904	342,710	6,025	298,694	647,429
1905	506,819	6,490	255,846	769,155
1906	628,152	141,854	213,867	983,873
1907	672,561	123,972	167,074	963,607
1908	713,772	59,532	200,033	973,337
1909	697,068	241,207	171,722	1,109,997
1910	808,762	247,336	203,528	1,259,626
1911	737,261	207,193	237,009	1,181,463
1912	956,458	191,779	183,673	1,331,910
1913	1,048,433	229,402	328,086	1,605,921
1914	417,409	43,513	172,998	633,920
1915	802,128		66,323	868,451
1916	1,012,060			1,012,060
1917	883,346			883,346
Total	11,622,287	2,073,197	3,720,558	17,421,042

IRON ORE PRICES.

The prices of Canadian iron ores are naturally based on prices current in the United States. "Lake ores," that is, those originating in what is generally known as the Lake Superior iron region, and which contributes about 80 per cent of the iron and steel requirements of the United States are quoted per gross ton delivered at Lake Erie ports. Ore prices and freights are usually fixed at the beginning of each season, and the price of any individual ore then depends on its variation from the standard in iron and phosphorus content, etc.

Bessemer ores are quoted on the basis of 55 per cent iron natural and 0·045 per cent phosphorus dried at 212° F. The base for Non-Bessemer ores is 51·5 per cent iron natural.

Iron ore prices per gross ton during the past four years have been as follows:—

	1914 and 1915.	1916.	1917 to July 1, 1918.	From July 1, 1918.
Old Range Bessemer	$3 75	$4 45	$5 95	$6 40
Mesabi Bessemer	3 50	4 20	5 70	6 15
Old Range Non-Bessemer	3 00	3 70	5 20	5 65
Mesabi Non-Bessemer	2 85	3 55	5 05	5 50

Since 1900 the price of Old Range Bessemer ores has ranged between a minimum of $3 in 1904 and a maximum of $6.48 in 1900, Non-Bessemer ores being generally from 50 to 80 cents lower.

LAKE FREIGHT RATES.

Lake freight rates on iron ore from upper lake ports to lake Erie during the past four years have been as follows, in cents per ton:—

	1914.	1915.	1916.	1917.
From Escanaba, Mich. . . . cents.	35	25	35	75
" Marquette, Minn. . . . "	45	35	45	90
" the head of the Lakes. . . . "	50	40	50	100

The Marquette rate which covers shipments from Michipicoten fell from a maximum of 94 cents in 1900 to a minimum of 35 cents in 1915. The 1917 rate approaches very closely to the record.

Shipments from Key Harbour (Moose Mountain ore) have been at the Escanaba rate or 10 to 15 cents lower than Michipicoten.

The above rates are quoted net, there is an additional unloading charge of 10 cents per ton.

IRON ORE PRODUCTION IN THE UNITED STATES.

The shipments of iron ore from the Lake Superior district during 1917, including both rail and water shipments, were 64,275,000 gross tons, as compared with 66,394,507 tons shipped in 1916. The shipments in 1915 were 47,272,751 tons, in 1914, 32,729,726 tons; in 1913, 49,947,116 tons; and in 1912, 48,221,546 tons.

The total shipments of iron ore in the United States from all sources were in 1917, 75,573,181 gross tons as compared with 77,870,553 gross tons in 1916; 55,493,100 gross tons in 1915; 41,439,761 gross tons in 1914, and 61,980,437 gross tons in 1913.

During the past twenty years the Lake Superior district has supplied from 80 to 95 per cent of the total United States production.

PIG-IRON.

The total production of pig-iron in 1917, not including the output of ferro-alloys was 1,170,480 short tons (1,045,071 long tons) valued at $25,025,960, as compared with 1,169,257 short tons (1,043,979 long tons) valued at $16,750,898 in 1916.

The 1917 production included in addition to blast furnaces output a small quantity of high grade low phosphorous pig-iron made in electric furnaces the demand and high price offered for this grade of iron having made its manufacture from scrap steel in electric furnaces a profitable operation.

The electric pig-iron so produced amounted to 13,691 tons valued at $735,859, or an average of $53.75 per ton, and the production from blast furnaces was 1,156,789 short tons valued at $24,290,101. Thus, although the total production of pig-iron was slightly greater than in 1916 the actual production in blast furnaces was somewhat less than during the previous year.

The Nova Scotia production, all blast furnace pig, was 472,147 tons as against 470,055 tons in 1916, and was the highest output made since 1913 when the maximum production of 480,068 tons was reached.

The Ontario production shown as 698,333 tons included 684,642 tons of blast furnace pig, and 13,691 tons of pig-iron made from scrap steel in electric furnaces. Though included with the Ontario record a portion of the electric furnace output was made in electric furnace plants at Montreal and Shawinigan Falls, Quebec.

Of the total output in 1917, 14.092 tons were made with charcoal as against 17.304 tons made with charcoal in 1916.

By grades, the 1917 production included: Basic, 961,656 tons; Bessemer, 27,783 tons; and foundry and all other, 181,041 tons. The 1916 production included: Basic, 953,627 tons; Bessemer, 31.388 tons; foundry and malleable, etc., 184.242 tons.

Annual Production of Pig-Iron by Provinces, 1887-1917.

Year	Nova Scotia.		Ontario.		Quebec.		Total.	
	Short Tons.	Value.	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
		$		$		$		$
1887	19,320	250,000	...	...	5,507	116,192	24,827	366,192
1888	17,556	211,403	...	...	4,243	101,832	21,799	313,235
1889	21,289	383,202	...	...	4,632	116,670	25,921	499,872
1890	18,382	262,608	...	...	3,390	69,080	21,772	331,688
1891	20,840	297,728	...	...	3,051	71,173	23,891	368,901
1892	34,393	458,556	...	...	8,050	178,865	42,443	637,421
1893	46,472	553,408	...	...	9,475	236,875	55,947	790,283
1894	41,344	449,533	...	...	8,623	196,914	49,967	646,447
1895	35,192	417,083	...	...	7,262	169,653	42,454	586,736
1896	32,351	400,829	28,302	368,942	6,615	154,358	67,268	924,129
1897	22,500	230,000	26,115	291,466	9,392	217,235	58,007	738,701
1898	21,627	221,677	48,253	530,789	7,135	159,929	77,015	912,395
1899	31,130	404,300	64,749	808,157	7,094	164,849	102,943	1,377,306
1900	28,133	421,995	62,387	938,725	6,055	140,978	96,575	1,501,698
1901	151,130	1,764,017	116,371	1,599,413	6,875	149,493	274,376	3,512,923
1902	237,244	2,477,767	112,688	1,584,273	7,970	181,501	357,902	4,243,541
1903	201,246	2,186,273	87,004	1,345,464	9,635	210,973	297,885	3,742,710
1904	164,488	1,700,130	127,845	1,746,126	11,121	241,729	303,454	3,687,985
1905	261,014	2,440,722	256,704	3,868,197	7,588	166,267	525,306	6,475,186
1906	315,008	3,439,217	275,558	4,338,275	7,845	177,644	598,411	7,955,136
1907	366,456	4,211,913	275,459	4,581,309	10,047	232,004	651,962	9,125,226
1908	352,642	3,554,540	271,484	4,385,271	6,709	171,383	630,835	8,111,194
1909	345,380	3,453,800	407,012	6,003,441	4,770	125,623	757,162	9,581,864
1910	350,287	4,203,444	447,273	6,956,923	3,237	85,255	800,797	11,245,622
1911	390,242	4,682,904	526,635	7,606,939	658	17,282	917,535	12,307,125
1912	424,994	6,374,910	589,593	8,176,089	...	...	1,014,587	14,550,999
1913	480,068	7,201,020	648,899	9,338,992	...	...	1,128,967	16,540,012
1914	227,052	2,951,676	556,112	7,051,180	...	...	783,164	10,002,856
1915	420,275	5,463,575	493,500	5,910,624	...	...	913,775	11,374,199
1916	470,055	7,050,825	699,202	9,700,073	...	...	1,169,257	16,750,898
1917	472,147	10,387,234	698,333	14,638,726			1,170,480	25,025,960

Annual Production of Pig-Iron by Grades, and by Fuels.

In Short Tons.

Year.	By Grades.			By Fuels.		
	Basic.	Bessemer	Foundry and all other.	Charcoal.	Coke.	Electric.
1909	400,921	222,931	133,310	17,003	740,159	
1910	425,400	219,492	155,905	17,164	783,633	
1911	464,221	208,626	244,688	20,759	896,776	...
1912	544,534	256,191	213,862	21,701	992,886	...
1913	614,845	265,685	248,437	23,696	1,105,271	...
1914	346,553	230,817	205,794	9,380	773,784	...
1915	739,613	29,052	145,110	13,692	900,083	...
1916	953,627	31,388	184,242	17,304	1,151,953	...
1917	961,656	27,783	181,041	14,002	1,142,787	13,691

Monthly Prices of Foundry Pig-Iron at Montreal.*

	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
January	21 00	18 00	18 50	21 00	19 75	22 00	19 75	19 35	23 50	28 00
February	21 00	18 00	18 50	21 00	19 05	22 00	19 75	19 35	23 50	28 30
March	22 00	18 00	18 50	21 00	19 00	22 00	19 75	20 10	24 00	28 30
April	20 00	18 00	19 00	21 00	18 50	22 00	19 75	19 90	25 00	30 35
May	19 00	18 75	19 00	19 25	18 50	22 00	19 75	19 90	25 00	40 45
June	18 75	18 75	18 50	19 25	18 50	21 50	19 75	19 90	25 00	40 50
July	18 75	18 50	18 50	19 25	18 50	20 50	19 50	19 90	25 00	40 50
August	18 00	18 50	18 00	19 25	19 00	20 50	19 50	19 90	25 00	**
September	18 00	18 50	18 00	19 25	20 00	20 50	19 50	20 00	25 00	**
October	17 75	19 00	21 00	19 25	20 20	20 50	19 50	20 00	25 00	**
November	18 00	19 00	21 00	19 25	20 50	19 75	19 40	21 00	25 00	**
December	18 25	19 00	21 00	19 25	21 50	19 75	19 40	22 00	28 00	**
Average	19 21	18 50	19 13	19 83	19 44	21 17	19 61	20 10	24 92	

* No. 1 Foundry Pig-iron, f.o.b. cars Montreal, price per ton of 2,240 pounds on the opening market day of each month. Quotation furnished by the Dominion Iron & Steel Co., Ltd.

** No quotation.

Average Monthly Prices of Bessemer Pig-Iron at Pittsburgh.*

Per Gross Ton (2,240 Pounds).

—	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917
	$	$	$	$	$	$	$	$		$
January	19.00	17.34	19.90	15.90	15.05	18.15	14.96	14.59	21.58	35.95
February	17.90	16 78	19.34	15.90	15.90	18.15	15.09	14.55	21 51	35.95
March	17.86	16.25	18.60	15.90	15.09	18.15	15.09	14.55	21.75	37.70
April	17.49	15.78	18.27	15.90	15.15	17.90	14.90	14.55	21.95	42.20
May	16.93	15.84	17.52	15.90	15.13	17.70	14.90	14.59	21.95	45.15
June	16.90	16.05	16.60	15.90	15.15	17.14	14.90	14.70	21.95	54.70
July	16.83	16 46	16.40	15.90	15.20	16.70	14.90	14.95	21.95	57.45
August	16.23	17.03	16.09	15.90	15.46	16.52	14.90	15.95	21.95	54.75
September	15.90	18.05	15.90	15.90	16.15	16 65	14.90	16.85	22.26	48.03
October	15.71	19.53	15.90	15.44	17.80	16 60	14.84	16.95	24.08	37.25
November	16.59	19.90	15.82	15.00	18.02	16.02	14.59	17.51	30.15	37.25
December	17.40	19.90	15.90	15.03	18.15	15.77	14.70	19.65	35.58	37.25

* From the *Iron Age*.

Average Monthly Price of Local No. 2 Foundry Pig-Iron at Chicago.*

(At Furnace) per Gross Ton (2,240 Lbs.).

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917
	$	$	$	$	$	$	$	$	$	$
January	18.45	17.35	19.00	15.50	14.00	17.90	13.75	13.00	18.50	30.00
February	18.16	16.75	19.00	15.50	14.00	17.31	14.00	13.00	18.50	32.00
March	17.85	16.50	18.30	15.50	14.00	17.25	14.25	12.95	18.70	36.00
April	17.73	16.80	17.50	15.00	14.00	17.00	14.25	13.00	19.00	39.25
May	17.63	16.50	17.06	15.00	14.50	16.00	14.06	13.00	19.00	43.80
June	17.73	16.50	16.75	15.00	14.50	15.62	13.69	13.00	19.00	51.00
July	17.55	17.00	16.56	14.87	14.70	14.70	13.75	13.00	19.00	55.00
August	17.35	17.13	16.50	14.50	15.37	15.00	13.69	13.44	18.40	55.00
September	17.06	18.70	16.40	14.50	16.00	15.00	13.25	13.90	18.13	54.67
October	16.85	19.00	16.06	14.48	17.00	15.00	12.94	14.63	19.63	33.00
November	17.10	19.00	16.00	14.09	17.75	14.87	12.56	17.13	25.80	33.00
December	17.35	19.00	16.00	14.00	18.00	14.60	13.00	18.10	29.50	33.00

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* From the *Iron Age*, New York.

The quantities of ores, fuels and flux charged to blast furnaces during the past ten years is shown in the following table. In 1917 about 95·8 per cent of the ore charged, 53·3 per cent of the coke, and a large proportion of the limestone, were imported. Previous to 1896 the entire Canadian pig-iron production was from Canadian ores but since that date increasing quantities of imported pig-iron have been used.

The iron industry at Sydney and North Sydney has been built up on the basis of the Newfoundland Wabana ores and the local coal supply, while in recent years a portion of the limestone required has also been obtained from Port au Port, Newfoundland. In Nova Scotia, therefore, while the fuel is all domestic, the ore is practically all imported, though from a British colony.

In Ontario large quantities of United States "Lake ores" are used. All the fuel used, with the exception of a small quantity of charcoal is imported either as coke, or as coal for charging the by-product coke ovens at Sault Ste. Marie. A portion of the limestone flux is also obtained from quarries situated in the United States. In 1917, Ontario furnaces used 1,210,097 tons of imported ores and 92,065 tons of Canadian ores, the percentage being 93 per cent imported and 7 per cent Canadian. In 1916, 1,050,404 tons of imported ore, or 82·6 per cent of the total and 221,273 tons of Canadian ores, or 17·4 per cent of the total were charged. In 1915, 623,094 tons of imported ore, or 68 per cent of the total, and 293,305 tons or 32 per cent of Canadian ores were charged.

Iron Ore, Fuel, and Flux charged to Blast Furnaces.

Calendar Year.	Iron Ore charged.		Fuel charged.			Limestone.
	Canadian.	Imported.	Charcoal.	Coke from Canadian Coal.	Coke Imported or made from Imported Coal.	
	Short tons.	Short tons.	Bushels.	Short tons.	Short tons.	Short tons
1908	209,208	1,051,445	1,121,900	492,076	325,670	483,06
1909	231,994	1,235,000	1,779,258	412,016	507,255	526,076
1910	149,505	1,377,075	1,615,919	491,281	476,898	569,355
1911	67,434	1,628,308	1,900,459	543,933	577,398	625,21
1912	71,588	2,019,165	1,886,748	609,183	656,815	705,613
1913	139,436	2,110,828	2,206,191	710,200	706,888	630,119
1914	182,964	1,324,326	920,045	390,209	500,902	447,641
1915	203,305	1,463,488	1,314,957	578,743	486,022	573,743
1916	221,773	1,964,508	1,848,200	712,715	645,488	701,690
1917	92,065	2,084,231	1,288,390	634,962	723,657	709,82

IRON BLAST FURNACES IN CANADA IN 1917.

Of 19 furnaces 13 were in blast in 1917 for varying periods of time. The total daily capacity of the 19 furnaces is about 4,835 tons. The operating companies, with numbers and capacities of furnaces, were as follows:—

Dominion Iron & Steel Company, Sydney, C.B.: Six completed furnaces; one of 350 tons capacity and five of 250 tons capacity each per day; three operated throughout the year, one for 261 days and one for 113 days; one furnace idle throughout the year.

Nova Scotia Steel & Coal Co., Ltd., New Glasgow, N.S.: Two stacks and one set of stoves at Sydney Mines, C.B., of 250 tons capacity; operated throughout the year.

Londonderry Iron & Mining Co., Ltd., Londonderry, N.S. (in liquidation); One furnace of 100 tons capacity idle throughout the year, not operated since 1908.

Canada Iron Foundries, Ltd., Montreal, Que.: Two furnaces one of 125 tons, and the other of 250 tons capacity, at Midland Ont.: both idle throughout the year, not operated since 1913, the larger furnace sold to and removed by the Algoma Steel Corporation, Ltd.

Standard Iron Co., Ltd., Deseronto, Ont.: One furnace at Deseronto with a daily capacity of 65 tons, operated 214 days; one furnace of 65 tons at Parry Sound, idle throughout the year, not operated since 1913.

The Steel Company of Canada, Ltd., Hamilton, Ont.: Two furnaces; one of 260 tons capacity, operated for 295 days, a second furnace of 430 tons capacity operated 360 days.

Algoma Steel Corporation, Ltd., Sault Ste. Marie, Ont.: Three furnaces at Steelton, near Sault Ste. Marie; two of 280 tons capacity each, and one of 500 tons capacity, operated throughout the year. One new 400-ton furnace under construction.

The At[illegible] Iron Co. Ltd., Port Arthur, Ont.: One furnace of 175 tons capacity idle throughout the year, not operated since 1911.

The Canadian Furnace Co. Ltd., Port Colborne, Ont.: One furnace of 325 tons capacity operated 357 days in 1916.

ELECTRIC FURNACE PLANTS MAKING PIG-IRON.

Fraser, Brace & Co., Ltd.: Furnace plant at Shawinigan Falls, Que: One single phase 2½-ton furnace, a non-tilting, silicon brick lined shell on a solid foundation.

Canada Cement Company, Ltd., Montreal, Que.: The steel department includes two open-hearth furnaces and four 6-ton electric furnaces of three phase arc type. The electric furnaces were operated on pig-iron during a portion of the year.

Electro Foundries, Ltd., Orillia: One 6-ton three phase type electric furnace.

Wm. Kennedy & Sons, Collingwood: One electric furnace.

Turnbull Electro Metals, Ltd., St. Catharines, Ont.: One 6-ton three phase type electric furnace.

British Forgings, Ltd., Toronto, Ont.: An electric steel furnace plant comprising ten 6-ton Heroult furnaces some of which were used for the production of pig-iron during a portion of 1917.

Tivani Electric Steel Co., Ltd., Belleville, Ont.: This electric steel plant which includes three small furnaces was operated for the production of ferro-molybdenum during 1917, but in March, 1918, began the production of pig-iron.

Aetna Iron and Steel Co., Ltd., Port Moody, B.C.: One 6-ton Heroult electric furnace,—first production in May 1918.

Hull Iron and Steel Foundries, Hull, Que.: One 6-ton three phase tilting type, electric furnace,—first production in April 1918.

Electric Smelting Co. of Brantford, Ltd., Hull, Que.: One 4-ton electric furnace,—first production in June 1918.

FERRO-ALLOY PRODUCTION.

The production of ferro-alloys during 1917 which reached a total of 43,465 tons, valued at $3,549,814 included ferro-silicon, ferro-molybdenum and ferro-phosphorus made in electric furnaces, a small tonnage of low grade ferro-silicon recovered as a by-product in the manufacture of abrasives from bauxite in electric furnaces and some blast furnace spiegeleisen.

The total production during 1916 which included only ferro-silicon, ferro-molybdenum and ferro-phosphorus made in electric furnaces, was 28,628 tons, valued at $1,777,615, as against 10,794 tons, valued at $753,404 in 1915; 7,524 tons, valued at $478,355 in 1914, and 8,075 tons, valued at $463,018 in 1913. In 1912 the production was 7,834 tons, valued at $465,225 and in 1911, 7,507 tons, valued at $376,404.

FERRO-ALLOY PLANTS IN 1917.

Electro Metals, Ltd., Welland, Ont.: Plant includes 8 electric furnaces producing ferro-silicon of 25 per cent, 50 per cent, 75 per cent, and 85 per cent grades.

Tivani Electric Steel Co., Ltd., Belleville, Ont.: Small electric furnaces comprising three units of two furnaces each making ferro-molybdenum in 1917.

International Molybdenum Co. Ltd., Orillia, Ont.: Two small electric furnaces producing ferro-molybdenum in 1917.

Algoma Steel Corporation, Sault Ste. Marie, Ont.: Producing spiegeleisen in blast furnace.

The following firms were also recovering low grade ferro-silicon as a by-product in the manufacture of artificial abrasives in electric furnaces from bauxite:—

D. A. Brebner, Ltd., Hamilton, Ont.
National Abrasive Co., Hamilton, Ont.
The Exolon Company, Thorold, Ont.
The Norton Company, Chippewa, Ont.
The Canadian Aloxite Co., Niagara Falls, Ont.

Electric furnace plants for the manufacture of 50 per cent ferro-silicon are also under construction in 1918 by,

The Canadian Ferro Alloys Ltd., at Shawinigan Falls, Que.
The Leaside Munitions Ltd., at Beaupré, Que.

EXPORTS AND IMPORTS OF PIG-IRON.

The exports of pig-iron during 1917 are reported as 12,081 tons, valued at $423,814 or an average of $35.08 per ton, as against exports during 1916 of 23,304 tons, valued at $374,383, or an average of $16.07 per ton. The exports of ferro-alloys during the same year were 33,212 tons, valued at $2,616,924, or an average of $78.79 per ton, as compared with exports in 1916 of 22,802 tons, valued at $1,352,013, or an average of $59.29 per ton.

The total exports of pig-iron and ferro-alloys were thus 45,293 tons, valued at $3,040,738 in 1917, as against 46,106 tons, valued at $1,726,396 in 1916.

The exports between 1905 and 1913 did not exceed 10,000 tons in any one year, and consisted largely, if not entirely, of ferro-alloys. During 1914, however, there was a small export of pig-iron, chiefly from Sydney to Philadelphia. The exports during the first three months of the year were 4,431 tons, which probably included about 4,000 tons of pig-iron. From the first of April the exports were separately classified and during the last nine months of the year included 9,767 tons of pig-iron valued at $118,111, or an average of $12.09 per ton, and 4,865 tons of ferro-alloys valued at $285,221, or an average of $58.63 per ton.

Annual Exports of Pig-Iron and Ferro-alloys, 1915-17.

Calendar Year.	Pig-iron.			Ferro-alloys.		
	Short tons.	Value.	Average value.	Short tons.	Value.	Average value.
		$	$		$	$
1915.	17,307	231,551	13.38	9,238	537,081	58.14
1916.	23,304	374,383	16.07	22,802	1,352,013	59.29
1917	12,081	423,814	35.08	33,212	2,616,924	78.79

The imports of pig-iron during 1917 as shown by the Customs reports were 83,390 tons, valued at $2,763,502, and the imports of ferro-alloys 12,828 tons, valued at $2,029,990, making a total of 96,218 tons, valued at $4,793,492. As against this record, however, the United States Department of Commerce shows exports to Canada during the same period of pig-iron and ferro-alloys amounting to 171,147 short tons, valued at $6,279,651.

The Canadian imports of pig-iron in 1916 were 58,130 tons, valued at $1,145,150, and of ferro-alloys 14,777 tons, valued at $1,879,538, or a total of 72,907 tons, valued at $3,024,688.

Previous to 1907 the annual imports of pig-iron varied from less than 20,000 tons to nearly 100,000 tons per annum. In 1907, however, the imports exceeded 250,000 tons and during each of the years from 1910 to 1913, inclusive, the imports exceeded 200,000 tons.

The annual imports of ferro-alloys during the past few years have varied between 11,000 and 30,000 tons, having reached a maximum in 1913. During 1917 the exports of ferro-alloys were more than double the imports.

Annual Imports of Pig-Iron showing Country of Origin.

Calendar Year.	United States.			Great Britain			Other Countries		
	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.
1908	26,434	$ 448,794	$16 98	30,574	$ 414,110	$13 54	335	$8,705	$25 99
1909	50,167	735,139	14 65	87,394	1,055,790	12 08	364	7,255	19 93
1910	107,984	1,516,688	14 05	119,678	1,603,951	13 40	91	2,059	22 63
1911	122,390	1,552,896	12 69	86,125	1,058,078	12 29	2	15	7 50
1912	210,756	2,599,117	12 33	61,800	912,462	14 76	....		
1913	213,989	2,888,974	13 50	22,800	358,431	15 72			
1914	69,254	862,598	12 46	9,426	119,501	12 68			
1915	46,894	615,268	13 12	588	8,932	15 19			
1916	57,256	1,129,790	19 73	594	10,614	17 87	290	4,737	16 91
1917*	....					....	.....	....	

*Destinations not reported for 1917.

Annual Imports of Pig-Iron since 1907.

Year.	Pig iron.			Charcoal Pig-iron.			Total.	
	Short tons.	Value.	Average value.	Short tons	Value.	Average value.	Short tons.	Value.
		$	$		$	$		$
1907..........	249,582	4,117,887	16 50	2,062	41,806	20 27	251,644	4,159,693
1908..........	57,343	871,615	15 20	1,022	18,818	18 41	58,365	890,433
1909..........	137,925	1,798,192	13 04	413	5,727	13 87	138,338	1,803,919
1910..........	227,753	3,122,695	13 71	16,106	242,152	15 03	243,859	3,364,847
1911..........	208,487	2,610,989	12 52	....	..		208,487	2,610,989
1912..........	272,565	3,511,599	12 88	115	1,370	11 91	272,680	3,512,969
1913..........	235,843	3,234,877	13 72	926	12,528	13 53	236,769	3,247,405
1914..........	78,594	981,107	12 48	86	1,082	12 58	78,680	982,189
1915..........	47,482	624,200	13 15	....	......	..	47,482	624,200
1916..........	57,397	1,128,557	19 68	793	16,593	20 92	58,190	1,145,150
1917..........	82,758	2,744,055	33 16	632	19,447	30 77	83,390	2,763,502

Imports of Ferro-alloys, 1916 and 1917.

	1916.			1917.		
	Tons.	Value.	Value per ton.	Tons.	Value.	Value per ton.
		$	$ cts.		$	$ cts.
Ferro-silicon containing not more than 15% silicon.	1,563·7	41,456	26 51	1,243·3	50,067	40 27
Ferro-silicon containing more than 15% silicon.	7·9	835	105 70	7·6	2,126	279 73
Spiegeleisen and ferro-manganese containing over 15% manganese.	12,658·0	1,399,660	110 58	10,872·0	1,430,091	131 54
Spiegeleisen and ferro-manganese containing not more than 15% manganese and other ferro-products, n.o.p.	547·4	437,587	799 39	705·6	547,706	776 23
	14,777·0	1,879,538	....	12,828·5	2,029,990	....

Imports of Ferro-Manganese, Ferro-Silicon, etc.

Calendar year.	Short tons.	Value.	Average value.	Calendar year.	Short tons.	Value.	Average value.
		$	$			$	$
1907	15,437	536,285	34 74	1913	30,355	990,443	30 98
1908	11,718	401,761	34 29	1914	22,147	549,485	27 81
1909	17,699	411,536	23 25	1915	13,758	807,312	58 68
1910	18,900	464,741	24 59	1916	14,777	1,879,538	127 19
1911	17,226	429,458	24 93	1917	12,828	2,029,990	158 25
1912	19,810	469,884	23 72				

CONSUMPTION OF PIG-IRON AND FERRO-ALLOYS.

The total quantity of pig-iron and ferro-alloys used in Canada arrived at by adding to the production the excess of imports over exports amounted in 1917 to 1,264,870 tons, as against 1,224,686 tons in 1916, and 959,254 tons in 1915. Of the total amount consumed in 1917, 1,146,861 tons are reported as having been used in steel furnaces, leaving 118,009 tons of iron available for foundry and other uses. The consumption in steel furnaces included 1,112,082 tons of pig-iron and 34,779 tons of ferro-alloys.

The annual consumption since 1910 compiled upon the same basis is shown in the following table:—

Consumption of Pig-Iron and Ferro-alloys.

Year.	Used in steel furnaces.		Available for foundry and other uses.	Total consumption.* Short tons.
	Pig-iron.	Ferro-alloys.		
1910	690,913	8,143	361,914	1,060,970
1911	700,679	21,359	422,847	1,144,885
1912	735,559	24,237	548,024	1,307,820
1913	913,722	29,408	454,710	1,397,840
1914	619,030	20,252	233,170	872,452
1915	748,114	13,941	197,199	959,254
1916	949,444	25,940	249,302	1,224,686
1917	1,112,082	34,779	118,009	1,264,870

* Production of pig-iron and ferro-alloys plus excess of imports over exports.

STEEL.

The production of steel during 1917 has been reported from 27 separate plants (including 8 electric furnace plants), operated by 24 companies.

The total production of steel ingots and castings during the year was 1,745,734 short tons, as compared with 1,428,249 tons in 1916 and 1,020,896 tons in 1915. The increase in 1917 over 1916 was 317,485 tons or over 22 per cent as against an increase in 1916 over the previous year nearly 40 per cent.

The 1917 production included, open-hearth steel, 1,685,715 tons; electric steel, 50,467 tons; crucible and converter steels, 9,552 tons. In 1916 the open-hearth production was 1,400,883 tons; electric steel, 19,639 tons; Bessemer, crucible and other steels, 7,727 tons.

The production of electric steel in 1915 was 5,625 tons, and in 1914, the first year for which a production was reported, 61 tons.

Statistics of the production of steel ingots and castings since 1894 are given in the following table, the figures for 1894 to 1906, inclusive, having been collected and published by the American Iron and Steel Association; those for the years 1907 to 1916 have been collected by this Department.

Annual Production of Steel Ingots and Castings.

(In short tons).

Year.	Steel Ingots.				Steel Castings.			Total ingots and castings.
	Open hearth.	Bessemer.	Electric and other steels	Total ingots.	Open-hearth.	Electric and other steels.	Total castings.	
1894	......	......	......	......	......	......	......	28,767
1895	......	......	......	......	......	......	......	19,040
1896	......	......	......	......	......	......	......	17,920
1897	......	......	......	......	......	......	......	20,608
1898	......	......	......	......	......	......	......	24,125
1899	......	......	......	......	......	......	......	24,640
1900	......	......	......	......	......	......	......	26,406
1901	......	......	......	......	......	......	......	29,214
1902	......	......	......	197,959	......	......	5,922	203,881
1903	......	......	......	198,249	......	......	5,047	203,296
1904	......	......	......	159,352	......	......	7,286	166,638
1905	......	......	......	441,342	......	......	10,521	451,863
1906	......	......	......	622,623	......	......	16,773	639,396
1907	459,240	225,989	......	685,229	20,602	1,151	21,753	706,982
1908	443,442	135,557	......	578,999	9,051	713	9,764	588,763
1909	535,988	203,715	......	739,703	14,013	1,003	15,016	754,719
1910	580,932	222,668	......	803,600	18,085	599	18,684	822,284
1911	651,676	209,817	......	861,493	20,163	740	20,903	882,396
1912	692,236	231,044	......	923,280	31,845	2,556	34,401	957,681
1913	824,818	301,932	......	1,126,750	39,217	3,026	42,243	1,168,993
1914	608,383	203,184	......	811,567	15,315	1,759	17,074	828,641
1915	962,411	19,448	7,970	989,829	28,384	2,683	31,067	1,020,896
1916	1,377,387	1,416	18,900	1,397,703	23,496	7,050	30,546	1,428,249
1917	1,642,085		49,206	1,691,291	43,630	10,813	54,443	1,745,734

Materials charged to Steel Furnaces.—The total quantity of pig-iron used in steel furnaces during 1917 was 1,112,082 tons, of which 993,805 tons were produced by the firms reporting, and 118,277 tons purchased. The quantity of ferro-alloys used was 34,779 tons. The total quantity of scrap iron and steel used was 1,022,456 tons, of which 527,400 tons originated with the firms reporting, and 495,056 tons were reported as purchased. Ores used included 2,726 tons of manganese ore and 39,793 tons of iron ore, while 231,563 tons of limestone and dolomite were used, and 17,084 tons of fluorspar. In Ontario, about 1,188 million cubic feet of natural gas were used, while in Nova Scotia coke-oven gas was used at Sydney, of which a record of quantity was not obtained.

A record of materials used in steel furnaces covering the past eight years is shown in the following table:—

Pig-Iron, Scrap Iron, and other Materials Charged to Steel Furnaces.

(In short tons).

Year.	Pig-iron.	Ferro-alloys.	Scrap Iron and Steel.	Iron Ore	Manganese Ore.	Fluorspar.	Limestone and Dolomite.
1910	690,913	8,143	211,453	39,332	1,317	7,461	144,110
1911	700,769	21,359	278,797	42,892	829	8,067	130,270
1912	735,559	24,237	336,265	43,006	985	9,709	148,045
1913	913,722	29,408	406,403	55,018	1,342	10,687	197,028
1914	619,030	20,252	286,863	37,686	723	7,845	114,859
1915	748,114	13,941	413,266	74,872	908	13,520	252,045
1916	949,444	25,940	469,162	55,059	1,578	13,213	224,772
1917	1,112,082	34,779	1,022,456	39,793	2,726	17,084	231,563

It will be noted that there is a large consumption of scrap iron and steel in the manufacture of steel ingots and castings. For each 100 tons of pig-iron used in 1917 the quantity of scrap charged was 91 tons. In 1916, 71·5 tons of scrap iron were used to each 100 tons of pig-iron and in the two preceding years the ratios were 55·2 tons and 46·3 tons respectively.

The exports of scrap iron and steel in 1917 are shown by the customs reports as 176,571 tons, valued at $2,300,022, or an average of $13.02 per ton, as against exports of 114,300 tons, valued at $1,357,018, or an average of $11.87 per ton in 1916, and 89,358 tons, valued at $883,134, or an average of $9.88 per ton in 1915.

From 1900 to 1912 the annual exports of scrap varied considerably, the lowest being 4,208 tons in 1911 and the highest 24,109 tons in 1905. During the past five years the exports have increased very rapidly.

The total imports of scrap iron and scrap steel in 1917 are reported as 20,654 tons, valued at $454,079, or an average of $21.98 per ton, as against imports in 1916 of 11,574 tons, valued at $179,751, or an average of $15.53 per ton, and imports in 1915 of 11,477 tons, valued at $127,614, or an average of $11.12 per ton. In 1913 the imports exceeded 100,000 tons and during the preceding 20 years the imports varied from 8,000 tons to 70,000 tons per annum.

Tabulated records of the exports and imports of scrap iron and steel were published in the report on production of iron and steel, 1916.

Rolling Mill Production.—Statistics of the production of rolled iron and steel products have been received from all firms operating rolling mills in Canada. The principal rolled products are, in addition to blooms and billets, steel rails, wire rods, bars and rods, and a small tonnage of plates and structural steel. In addition to rolled products there are also manufactured at some of these plants, forgings, angle splice bars, rail fastenings, nails and spikes, wire and wire fencing, and many other classes of finished iron and steel products, a detailed record of which is not obtained.

The quantity of steel used by rolling mills in 1917 included 1,503,599 tons of ingot produced by firms reporting, 49,680 tons of ingots, blooms, billets, and plates, purchased, and 125,554 tons of scrap iron and steel. In 1916 the quantity of steel used by rolling mills included 1,360,797 tons of ingots produced by firms reporting 83,090 tons of ingots, blooms, and billets purchased, and 130,734 tons of scrap iron and steel. In 1915 the quantities of steel used included 1,033,682 tons of ingots produced by firms reporting 21,975 tons of ingots, blooms and billets purchased, and 57,051 tons of scrap iron and steel.

The production in 1917 included: Steel rails, 46,645 tons; wire rods, 195,392 tons; bars, plates and structural steel, 631,389 tons; forged products, 87,155 tons. The production in 1916 included: Steel rails, 90,123 tons; wire rods, 179,226 tons; bars and plates, 619,500 tons; forged products, etc., 152,668 tons. The production in

1915 included: Steel rails, 232,411 tons; wire rods, 124,381 tons; bars and plates, 294,595 tons; forged products, etc., 34,358 tons. In addition to the above there was also a small production of billets for export.

The annual production of rolling mills in so far as returns have been furnished to this Department, are as follows:—

Annual Production of Rolling Mills.

(In short tons).

Year.	Steel Rails.	Wire Rods.	Bars and Plates.	Other Products.*
1908	300,935	41,420	......	......
1909	377,642	81,762	......	......
1910	399,762	88,456	128,9[illegible]0	28,354
1911	399,760	85,811	202,023	62,676
1912	471,422	68,174	267,797	36,441
1913	554,481	57,389	269,096	51,654
1914	428,226	63,856	143,754	42,070
1915	232,411	124,381	294,595	34,358
1916	90,123	179,276	619,500	152,668
1917	46,645	195,392	65[illegible],389	87,155

* Includes forged products, angle splice bars, and rail fastenings.

Steel Billets.—A record of monthly prices of mild steel billets at Montreal as quoted by the Dominion Iron and Steel Company, is shown in an accompanying table.[1]

During 1916 prices steadily increased during the year, quotations in January and February being from $38.50 to $40.50 per gross ton and in December from $52 to $55 per gross ton. In April of 1917 the price was increased to $60 and for the last eight months of the year, quotations are not recorded.

In Pittsburgh, open-hearth billets averaged $32 per gross ton in January, 1916, increasing to $45 in April and May. There was a slight decrease during the next three months followed by further increases to a maximum monthly average of $57.50 in December. In 1917 prices continued to increase, reaching a maximum of $100 in July. A fixed maximum of $47.50 came into full effect in November.

Monthly Prices of Mild Steel Billets at Montreal.*

—	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
January	30 00	26 00	26 50	27 00	24 75	26 50	24 50	24 75	39 50	53 50
February	30 75	26 00	26 50	27 00	23 75	30 00	24 50	24 75	39 50	53 50
March	31 00	26 25	26 50	27 00	23 75	30 00	24 50	26 50	45 50	53 50
April	30 75	26 25	26 50	27 00	23 75	30 00	25 25	26 50	44 50	60 00
May	31 75	26 25	26 50	26 75	23 75	31 00	25 25	26 50	44 50	* *
June	33 75	26 50	26 00	25 75	23 75	31 00	25 25	26 50	44 50	
July	26 75	26 50	26 00	25 75	23 75	29 00	25 25	26 50	44 50	
August	27 00	26 50	25 75	25 00	24 25	29 00	25 25	29 50	44 50	
September	27 00	26 25	25 50	25 00	24 75	28 00	25 25	31 00	44 50	
October	27 25	26 25	25 50	23 75	25 25	26 50	25 25	31 00	46 00	
November	27 00	26 25	24 75	23 75	25 25	25 50	24 75	32 00	52 00	
December	26 75	26 50	25 00	24 75	26 00	25 50	24 75	34 00	53 50	
Average	29 15	26 29	25 91	25 71	24 40	28 50	25 23	28 29	45 08	

*Average price per ton of 2,240 pounds, f.o.b. Montreal in the first week of each month, quotations supplied by the Dominion Iron & Steel Co., Ltd.
**No quotations.

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[1] Compiled from the annual records of wholesale prices published by the Department of Labour.

Average Monthly Prices of Bessemer Steel Billets at Pittsburgh.*

—	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
January	28 00	25 00	27 50	23 00	20 00	28 30	20 13	19 25	32 00	63 00
February	28 00	25 00	27 50	23 00	20 00	28 50	21 00	19 50	33 50	65 00
March	28 00	23 00	27 50	23 00	19 75	28 50	21 00	19 70	42 40	66 25
April	28 00	23 00	26 75	23 00	20 00	28 50	20 80	20 00	45 00	73 75
May	28 00	23 00	26 12	22 60	20 80	27 37	20 00	20 00	45 00	86 00
June	25 75	23 00	25 30	21 00	20 87	26 50	19 50	20 50	43 50	98 75
July	25 00	23 50	25 00	21 00	21 50	26 60	19 00	21 38	41 00	100 00
August	25 00	24 13	24 62	21 00	22 12	26 00	20 25	23 13	44 20	86 00
September	25 00	25 00	24 40	20 75	23 62	24 87	21 00	24 10	45 00	66 25
October	25 00	26 25	23 75	20 00	26 00	23 30	20 00	24 63	46 25	49 38
November	25 00	27 13	23 30	19 50	27 00	21 00	19 25	26 50	52 00	47 50
December	25 00	27 50	23 00	19 25	27 00	20 00	19 00	30 60	57 50	47 50

*As compiled and published by "The Iron Age," New York.

The Dominion Iron and Steel Company, has, during the past three years, been making some export of steel billets for European demand. The exports are separately reported by the Customs Department since April, 1917, and the total exports of billets, ingots, and blooms during the nine months ending December, 1917, were 41,558 tons valued at $1,831,917, or an average of $44.08 per ton. There was also an export of bars and rods during the same period of 41,321 tons valued at $3,633,787, or an average of $87.94 per ton.

There has been a considerable annual importation, as shown in the accompanying tables of iron and steel billets, and of iron and steel ingots, blooms, slabs, puddled bars, etc. The export records of the United States appear to show considerably larger exports of these products to Canada than is included in the Canadian record, a difference which may be due to the inclusion in the Canadian record of considerable quantities of material free of duty for the use of the Imperial Government.

According to the United States record[1] there was exported from the United States to Canada during the calendar year 1917, billets, ingots and blooms of steel, 150,533 gross tons (168,597 short tons), valued at $11,962,280, or an average of $70.95 per short ton, as against 105,260 gross tons (117,891 short tons), valued at $6,657,538, or an average of $56.43 per short ton, in 1916, and 58,486 gross tons (65,504 short tons), valued at $1,528,155, or an average of $23.33 per short ton, in 1915.

The second table following shows for a number of years the exports of billets, ingots and blooms of steel to Canada. The principal differences between this and the Canadian record appears to be for the years 1916 and 1917. There is shown in this table also a record of the exports from the United States to Canada of steel rails, sheets and plates, structural iron and steel, tin plate, etc., wire and manufactures of wire, pipe and fittings, and metal-working machinery.

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[1] Monthly Summary of Foreign Commerce of the United States, Department of Commerce, Washington, D.C.

Imports of Iron and Steel Ingots, Blooms, Billets, etc.

Fiscal Year.	Iron and steel billets weighing not less than 60 pounds per lineal yard.			Iron or steel ingots, cogged ingots, blooms, slabs, puddled bars and loops, or other forms, n.o.p., less finished than iron or steel bars, but more advanced than pig-iron, except castings.			Steel billets, n.o.p.			Total.	
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.
		$	$ cts.		$	$ cts.		$	$ cts.		$
1908	14,866	416,163	27 99	4,722	135,177	28.63	1,634	48,672	29 79	21,222	600,012
1909	3,940	95,350	24 20	3,715	53,135	14.30	1,232	31,869	25 86	8,887	180,354
1910	28,358	518,102	18 27	5,775	97,333	16.85	2,682	63,089	23 52	36,815	678,524
1911	44,457	861,036	19 37	3,228	68,616	21.26	711	19,940	28 05	48,396	949,592
1912	85,852	1,593,665	18 56	2,608	52,063	19 97	729	17,242	23 65	89,189	1,662,970
Calendar Year											
1913	51,765	1,178,151	22 76	665	19,379	29.61	453	14,784	32 67	52,873	1,212,314
1914	12,247	241,234	19 70	155	3,348	21.65	647	15,121	23 37	13,049	259 703
1915	32,210	715,493	22 21	10,980	316,814	28.85	10,928	238,380	21 81	54,118	1,270,687
1916*	12,627	495,625	39 25	7,946	385,816	47.29	303	14,005	46 24	20,876	895,446
1917*	10,186	663,668	65 15	10,243	714,908	69.79	348	22,573	64 83	20,777	1,401,149

* Import record not complete. See explanation in text.

Exports of Various Iron and Steel Products from the United States to Canada.

Calendar Year.	Billets, Ingots and Blooms of Steel.			Steel Rails for Railways.			Sheets and Plates.			Structural Iron and Steel.		
	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.
		$	$ cts.		$	$ cts.		$	$ cts.		$	$ cts.
1910	23,160	461,204	19 91	28,382	750,424	26 44	.....	.....	.....	83,838	2,346,393	39 91
1911	64,020	1,262,732	19 72	98,613	2,499,110	25 34	.....	.....	.....	115,420	4,113,858	35 64
1912	92,976	1,941,015	20 88	149,353	3,799,685	25 44	.....	.....	.....	190,346	6,823,072	35 85
1913	45,568	964,373	21 16	181,408	4,791,569	26 41	356,344	12,364,721	34 70	322,766	10,463,154	32 42
1914	16,044	311,267	19 40	25,949	685,468	26 42	207,203	6,855,494	33 09	125,457	3,454,372	27 53
1915	65,504	1,528,155	23 33	8,521	230,637	27 07	223,715	7,781,270	34 78	110,725	3,063,362	27 67
1916	117,891	6,657,538	56 43	46,011	1,586,639	34 48	255,935	14,712,640	57 49	125,169	5,788,908	46 25
1917	168,597	11,962,280	70 95	54,088	1,815,768	33 57	256,948	25,451,608	99 05	131,383	9,235,063	70 29

Calendar Year.	Tin Plate, Terne Plates and Taggers Tin.			Wire.			Pipe and Fittings.			Metal Working Machinery.
	Short tons.	Value.	Value. per ton.	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value. per ton.	Value.
		$	$ cts.		$	$ cts.		$	$ cts.	$
1910	12,473	881,719	70 69	47,074	2,077,092	44 12	30,008	1,371,399	45 70	466,216
1911	32,095	2,243,492	69 90	62,895	2,670,765	42 46	40,485	1,853,764	45 79	1,083,718
1912	52,746	3,662,770	69 44	64,354	2,496,781	38 80	86,103	4,288,887	49 81	1,885,241
1913	51,524	3,842,159	74 57	53,749	2,143,449	39 88	79,929	4,093,699	51 22	1,888,463
1914	39,770	2,614,859	65 75	53,254	2,083,150	39 12	.....	.....	.....	767,064
1915	43,854	2,762,406	62 99	51,963	2,159,436	41 56	15,374	954,817	62 10	4,336,065
1916	57,633	4,694,005	81 45	66,690	4,289,572	64 32	21,859	1,697,511	77 66	7,929,989
1917	66,329	9,160,783	138 11	54,447	4,456,359	81 84	22,333	2,524,362	113 03	5,542,853

Steel Rails.—The production of steel rails in Canada during 1917 was 46,645 short tons, as against 90,123 short tons in 1916, and 232,411 short tons in 1915. The annual production from 1905 to 1915 varied between 200,000 tons and 500,000 per annum.

The exports of steel rails during the nine months ending December 31, 1917, were 26,402 tons, valued at $1,605,742, or an average of $60.82 per ton. Previous to April 1, 1917, the exports of rails were not separately classified, although during the past three years shipments have been made to South Africa and the United States. The imports of steel rails as recorded in the Customs reports were 18,160 tons, valued at $689,197. The United States exports to Canada during the same period, however, are reported as 54,088 short tons, valued at $1,815,768, or an average of $33.57 per ton.

The annual imports of steel rails from 1895 to 1905 ranged between 50,000 tons and 212,000 tons, averaging about 125,000 tons. From 1906 to date, however, or since the establishment of the rail mills at Sydney and Sault Ste. Marie, the imports have fallen to an annual average of about 60,000 tons, the variation being between a minimum of 10,420 tons in 1915 and a maximum of 177,041 tons in 1913.

Wire rods.—The production of wire rods in Canadian rolling mills in 1917 was 195,392 tons as compared with 179,226 tons in 1916, and 124,381 tons in 1915. From 1908 to 1914 inclusive, the average annual production was about 70,000 tons. The imports of wire rods in the coil in 1917 were 55,314 tons valued at $3,536,504, or an average of $63.93 per ton as compared with imports in 1916 of 66,166 tons valued at $3,069,162, or an average of $46.39 per ton. The annual imports have varied between rather wide limits having been as high as 55,000 tons in 1902 and less than 10,000 tons in 1908, the highest import having been reached during the fiscal year of 1913 with a total of 91,919 tons.

The average monthly price of wire rods in Pittsburgh in 1917 rose from $75 in January to a maximum of $96.25 in August. Quotations were then shaded off to the Government fixed price of $57 which received approval on October 11, 1917.

Annual Imports of Wire Rods.*

Calendar Year.	Short Tons.	Value.	Value per Ton.	Calendar Year.	Short Tons.	Value.	Value per Ton.
		$	$ cts.			$	$ cts.
1913	79,608	1,962,235	24 65	1916	66,166	3,069,162	46 39
1914	65,250	1,472,597	22 57	1917	55,314	3,536,504	63 93
1915	71,839	1,695,842	23 60				

* Rolled iron wire rods in the coil of iron or steel not over ⅜' inch in diameter when imported by wire manufacturers for use in making wire in the coil in their own factories.
Rolled round rods in the coil of iron or steel for the manufacture of chains.

Average Monthly Prices of Bessemer Wire Rods at Pittsburgh.*

	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
January	34 30	33 00	33 00	28 00	24 37½	30 00	25 50	25 00	43 00	75 00
February	35 00	33 00	33 00	28 75	25 00	30 00	26 38	25 00	48 00	......
March	35 00	33 00	33 00	29 00	25 00	30 00	26 50	25 00	54 80	81 00
April	35 00	29 00	32 50	29 00	25 00	30 00	26 00	25 00	60 00	85 00
May	35 00	27 50	32 00	29 00	25 00	30 00	25 50	25 00	60 00	86 00
June	33 50	27 50	30 80	28 25	25 00	29 50	24 50	25 00	53 75	92 50
July	33 00	29 40	29 20	27 00	25 00	28 30	24 50	25 63	55 75	96 25
August	33 25	31 00	28 25	27 00	25 80	28 00	25 00	27 00	55 00	94 00
September	33 00	31 50	28 00	27 00	27 00	27 37½	26 20	29 40	55 00	88 75
October	33 00	31 87½	28 50	26 00	28 50	26 60	25 88	31 75	55 00	77 25
November	33 00	32 50	28 12½	25 30	29 75	25 87½	25 25	36 25	63 00	57 00
December	33 00	33 00	28 00	24 50	30 00	25 17	25 00	39 00	68 75	57 00

* As compiled and published by "The Iron Age," New York.

Tin Plate.—There is no production of tin plate in Canada. The imports during 1917 were 66,676 tons valued at $9,985,631, or an average of $149.76 per ton as compared with imports in 1916 of 57,543 tons valued at $5,221,163, or an average of $90.74 per ton. The imports during the past ten years have averaged about 42,500 tons per annum.

Annual Imports of Tin Plate.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1909	36,904	2,216,089	1914	50,791	3,151,385
1910	39,101	2,475,010	1915	45,165	2,883,951
1911	47,006	3,172,943	1916	57,548	5,221,163
1912	60,502	3,826,735	1917	66,676	9,985,631
1913	58,031	3,954,615			

EXPORTS AND IMPORTS OF IRON AND STEEL GOODS.

Canada imports large quantities of iron and steel, much larger quantities than are manufactured in domestic steel mills. Reference has already been made to exports and imports of a few specific products; the following, however, is a general summary of the available records relating to exports and imports of iron and steel as compiled from the reports of the Customs Department. Mention has already been made of the fact that some of these records such as imports of billets, steel rails, and pig-iron, are apparently incomplete. It is assumed that considerable quantities of these products have been imported by and for the use of the Imperial Government as munitions of war and entered under a special item of the Customs classification to cover such imports instead of under the usual classification. This fact should be kept in mind in analysing the statistics, since it may explain a number of apparent discrepancies between these records and those available from other sources, such, for instance, as the United States Department of Commerce records of Foreign Trade.

The exports of iron and steel from Canada have consisted chiefly of manufactured goods, such as agricultural implements, automobiles, bicycles, machinery, etc. During the past two years, however, there have been considerable exports of steel rails, billets, rods and wire products.

The total recorded value of iron and steel exported during the calendar year 1917 was $46,791,681, as compared with a value of exports in 1916 of $63,958,558 and in 1915 of $48,268,148.

The exports during 1917 included: Pig-iron and ferro-alloys, 45,293 tons valued at $3,040,738; scrap iron and steel, 176,571 tons valued at $2,300,022; wire and wire nails, 105,482 tons valued at $9,823,700; billets, bars, rods and rails during the last nine months of the year, 109,281 tons valued at $7,071,446; agricultural implements valued at $5,430,906; automobiles and bicycles, $6,711,888; other manufactures of iron and steel, $12,412,981.

The exports during 1916 includued: Pig-iron and ferro-alloys, 46,106 tons valued at $1,726,396; scrap iron and steel, 114,300 tons valued at $1,357,018; wire and wire nails, 122,526 tons valued at $8,597,320; agricultural implements valued at $3,740,494; automobiles and bicycles, $6,807,499; other manufactures of iron and steel, $729,831.

The exports during 1915 included: Pig-iron and ferro-alloys, 26,545 tons valued at $768,632; scrap iron and steel, 89,358 tons valued at $883,134; wire and wire nails 71,998 tons valued at $3,224,740; agricultural implements valued at $3,417,060; automobiles and bicycles, $7,139,712; other manufactures of iron and steel, $32,834,870.

The exports during 1914 included: Pig-iron and ferro-alloys, 19,063 tons, valued at $486,366; scrap-iron and steel, 35,405 tons, valued at $446,337; wire and wire nails, 9,663 tons, valued at $355,781; agricultural implements, valued at $5,788,899; automobiles and bicycles, $3,409,749; other manufactures of iron and steel, $3,904,614.

A detailed record of these exports during the last two years is shown in the accompanying table:—

Exports of Iron and Steel Goods, the Products of Canada, during the Calendar Years 1916 and 1917.

—		1916.			1917.		
		Quantity.	Value.	Average Value.	Quantity.	Value.	Average Value.
			$	$		$	$
Stoves	No.	....	29,956	....	....	50,451	....
Gas buoys and parts of	$	....	2,484	....	....	85	....
Castings, n.e.s	"	....	167,881	....	....	583,297	....
Pig-iron	Tons.	23,304	374,283	16·07	12,081	423,814	35·08
Ferro-silicon and ferro-alloys	"	22,802	1,352,013	59·29	33,212	2,616,924	78·79
Bars and rods†	"	....	....	....	41,321	3,633,787	87·94
Billets, ingots and blooms†	"	....	....	....	41,558	1,831,917	44·08
Rails†	"	....	....	....	26,402	1,605,742	60·82
Wire and wire nails	"	122,526	8,957,320	70·17	105,482	9,823,700	93·13
Machinery (linotype machines)	$	....	35,465	....	....	6,977	....
Machinery, n.e.s	$	....	1,206,863	....	....	2,499,581	....
Sewing machines, parts of	$	....	82,032	....	....	157,809	....
Washing machines, etc	$	....	5,763	....	....	6,400	....
Typewriters	No.	3,597	246,761	68·60	1,883	97,904	51·99
Scrap iron and steel	Tons.	114,300	1,357,018	11·87	176,591	2,300,022	13·02
Hardware, tools, etc	$	....	376,549	....	....	940,347	....
Hardware, n.e.s	$	....	515,613	....	....	917,177	....
Cream separators*	$	....	34,567	....	....	150,923	....
All other iron and steel	$	....	38,974,154	....	....	7,000,678	....
Agricultural implements—							
Mowing machines	No.	6,672	233,024	34·93	12,149	486,593	40·16
Reapers	"	1,115	65,011	58·31	2,771	188,897	68·17
Drills	"	4,712	317,831	67·44	6,240	314,435	50·39
Harvesters and binders	"	7,495	814,517	108·67	9,502	1,158,751	121·95
Ploughs	"	17,700	483,650	27·32	25,354	1,150,386	45·37
Harrows	"	6,691	97,214	14·53	4,093	93,609	22·87
Hay rakes	"	2,011	43,746	21·75	4,704	116,395	26·86
Seeders	"	2	128	64·00	26	2,621	100·81
Threshing machines	"	1,522	465,209	305·66	1,172	274,764	234·44
Cultivators	"	4,219	142,028	33·66	6,336	170,611	26·93
All other	$	....	292,603	....	....	297,640	....
Parts of	$	....	750,966	....	....	1,025,275	....
Automobiles	No.	12,579	6,078,668	483·24	9,492	4,561,875	480·60
" parts of	$	....	672,060	....	....	2,035,769	....
Bicycles	No.	580	50,894	87·75	454	61,984	136·53
" parts of	$	....	5,877	....	....	52,260	....
Gasolene engines	No.	529	86,310	163·16	800	152,275	190·34
Total		....	63,958,558	....	....	46,791,681	....

* 9 months in 1916. † 9 months in 1917.

Annual Exports of Iron and Steel Products since 1909.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1909*	7,172,413	1912	10,682,484	1915	48,268,148
1910	7,395,489	1913	13,999,149	1916	63,958,558
1911	9,907,281	1914	14,391,746	1917	46,791,681

* Agricultural implements, automobiles and bicycles included in 1909 and subsequent years.

Separate records, covering a period of years, of the annual exports of pig-iron and ferro-alloys and of scrap iron and steel have already been given on previous pages.

The total value of the imports of iron and steel goods during the calendar year 1917, subject to the explanation already made in respect to certain products not recorded under the usual and regular classification and therefore omitted from this record was $186,538,538 as compared with a value of $129,090,241 imported during the calendar year 1916, $74,308,983 imported during the calendar year 1915, $80,063,679 imported during 1914, and $145,226,972 imported during 1913. Previous to 1913 the record is shown covering the fiscal years. During the twelve months ending March, 1913, the imports were valued at $148,579,272, as against imports valued at $105,614,450 during the twelve months ending March, 1912.

Between 1895 and 1904, the imports of iron and steel increased from about $8,600,000 to over $40,000,000. During the next five years there was comparatively little change, but from 1909 to 1913 the increase was again very rapid. During the latter part of 1913 there was, however, a distinct check to imports with the heavy falling off shown in 1914 and 1915.

The imports during 1917 subject to duty were valued at $153,743,649, the imports free of duty during the same period being valued at $32,794,889.

The imports during 1916 subject to duty were valued at $107,863,317, the imports free of duty during the same period being valued at $21,226,931. These imports include all classes of manufactured iron and steel goods as well as those of cruder form. In many cases the values only of the imported goods are given, so that a total tonnage of imports cannot be stated. In the case of most of the cruder materials, however, the quantities are given and a compilation of these showing the importation of the cruder forms of iron and steel since 1909 is shown in the accompanying tables.

Thus, during the twelve months ending December 31st, 1916, there was imported 929,776 tons of iron and steel valued at $84,448,580, or an average of $90.83 per ton, together with other iron and steel goods. the quantities of which are not stated, valued at $102,089,958.

During the twelve months ending December, 1916, there were imported 864,916 tons of iron and steel valued at $52,114,258, or an average of $60.25 per ton, together with other iron and steel goods of which the quantities are not stated, valued at $76,975,990.

During the twelve months ending December, 1915, there were imported 771,007 tons of iron and steel valued at $27,504,685, or an average value per ton of $35.67, together with other iron and steel goods, the quantities of which are not stated, valued at $46,804,298.

Summary of Imports of Iron and Steel, 1916 and 1917.

Material.	1916			1917.		
	Tons.	Value.	Average	Tons.	Value.	Average.
		$	$		$	$
Pig-iron	58,330	1,145,150	19.63	83,416	2,764,165	33.14
Ferro-alloys and chrome steel	14,840	1,893,879	127.62	12,886	2,045,595	158.75
Ingots, blooms, billets, puddled bars, etc	(b) 20,876	895,446	42.89	(c) 20,778	1,401,782	67.46
Scrap iron and scrap steel	11,572	179,751	15.53	20,654	454,079	21.99
Plates and sheets	225,439	12,806,096	56.81	185,074	17,582,700	95.00
Tin plates and sheets	57,543	5,221,163	90.73	66,676	9,985,631	149.76
Bars, rods, hoops, bands, etc	198,654	13,352,807	67.27	228,512	22,567,187	98.76
Structural iron and steel	158,905	8,042,127	50.61	185,965	15,282,012	82.18
Rails and connexions	14,003	470,023	33.57	22,213	944,595	42.52
Pipe and fittings (*a*)	5,399	165,576	30.67	2,348	143,124	60.96
Nails and spikes	4,103	283,007	68.98	10,928	892,021	81.63
Wire (*a*)	66,115	4,305,674	65.12	51,764	4,409,376	85.18
Forgings, castings and manufactures	29,137	3,343,559	114.[illegible]	38,562	5,976,313	154.98
Total	(*b*) 864,916	52,114,258	60.25	(*c*) 929,776	84,448,580	90.83
Other iron and steel products valued at	....	76,975,990	....	....	102,089,958	
Total value of imports of iron and steel	....	129,090,248	....	....	186,538,538	

(*a*) There are additional imports of pipe and wire included under "other iron and steel products."

(*b*) This figure should be increased by nearly 100,000 tons and the value in proportion, because of the imports of steel billets entered under a general classification. See explanation under steel billets, page No. 24.

(*c*) This figure should be increased by about 150,000 tons. See footnote (*b*).

Summary of Tonnage of Iron and Steel Imported during Calendar Years 1913-17.

(In short tons.)

Material.	1913.	1914.	1915.	1916.	1917.
Pig-iron	236,769	78,680	47,482	58,330	83,416
Ferro-products and chrome steel	30,678	22,271	13,905	14,840	12,886
Ingots, blooms, billets, puddled bars, etc.	52,872	13,049	54,118	(b) 20,876	(c) 20,778
Scrap iron and scrap steel	104,747	27,688	11,477	11,574	20,654
Plates and sheets	365,675	227,633	224,484	225,439	185,074
Tin plates and sheets	58,031	50,791	45,165	57,543	66,676
Bars, rods, hoops, bands, etc	277,879	148,368	156,990	198,652	228,512
Structural iron and steel	439,871	160,538	126,780	158,905	185,965
Rails and connexions	182,421	42,064	12,481	14,003	22,213
Pipe and fittings (a)	30,663	15,614	4,489	5,399	2,348
Nails and spikes	7,584	4,864	1,522	4,103	10,928
Wire (a)	70,712	66,280	49,529	66,115	51,764
Forgings, castings and manufactures	32,604	20,339	22,585	29,137	38,562
Total	1,890,506	878,179	771,007	(b) 864,916	(c) 929,776

(a) There are additional imports of pipe and wire included under "other iron and steel products."

(*b*) (*c*) See footnotes to previous table.

Summary of Tonnage of Iron and Steel Imported 1909-13.

(In short tons.)

Material.	Twelve Months Ending March.				
	1909.	1910.	1911.	1912.	1913.
Pig-iron	58,591	159,506	270,102	201,112	291,904
Ferro-products and chrome steel	13,206	15,153	19,182	18,548	23,378
Ingots, blooms, billets, puddled bars, etc	8,887	36,819	48,395	89,190	86,745
Scrap iron and scrap steel	26,212	28,797	53,824	78,378	103,317
Plates and sheets	116,610	200,575	205,690	243,461	376,633
Tin plates and sheets	26,850	39,866	44,025	45,802	64,571
Bars, rods, hoops, bands, etc	73,261	117,159	183,865	195,139	278,878
Structural iron and steel	162,735	195,748	232,585	268,572	377,551
Rails and connexions	32,543	55,183	36,690	97,062	156,318
Pipe and fittings	18,309	16,705	28,831	26,627	40,987
Nails and spikes	1,611	3,476	3,374	7,201	11,429
Wire	39,375	68,211	64,850	69,597	80,846
Forgings, castings, and manufactures	14,394	18,093	24,523	27,668	47,195
Total	592,593	955,291	1,215,936	1,368,357	1,939,743

Annual Imports of Iron and Steel Products since 1895.

Year.	Value.	Year.	Value.	Year.	Value.	Year.	Value.
	$		$		$		$
1895 (a)	8,684,024	1901	25,023,453	1907*	44,739,403	1913 (b)	148,579,272
1896	10,206,759	1902	31,591,484	1908 (b)	64,257,238	1913 (c)	145,226,972
1897	11,063,156	1903	39,536,847	1909	42,075,797	1914	80,063,679
1898	16,340,992	1904	40,449,175	1910	62,356,974	1915	74,308,983
1899	19,463,329	1905	40,820,233	1911	88,179,152	1916 (c)	1[illegible]0,090,248
1900	27,926,766	1906 (a)	42,210,305	1912	105,614,450	1917	1[illegible]6,538,538

*Nine months ending March, 1907.
(a) Twelve months ending June from 1895 to 1906 inclusive.
(b) Twelve months ending March from 1908 to 1913 inclusive.
(c) Twelve months ending December from 1913 to date.